

What is claimed is:

1. A system for RF ablation comprising:
 - a catheter having an electrode and a temperature sensor;
 - 5 an RF energy source connected to the electrode for delivering RF energy via the electrode; and
 - a controller for controlling a duty cycle of the RF energy, wherein the controller is coupled to the temperature sensor and is adapted to change the duty cycle of the RF energy as a function of a thermal decay as determined by a
 - 10 measurement of change of temperature, as measured by the temperature sensor, over a time period.
2. The system of claim 1, wherein the controller determines the thermal decay in part as a function of one or more static thermal properties of the electrode.
- 15 3. The system of claim 2, wherein one or more static thermal properties of an electrode include a thermal constant of the electrode.
4. The system of claim 2, wherein one or more thermal properties includes a
- 20 mass of the electrode.
5. The system of claim 2, wherein one or more thermal properties includes surface area of the electrode.
- 25 6. The system of claim 1, wherein the duty cycle chosen can range from 1% to 100%.
7. The system of claim 1, wherein the duty cycle chosen can range from 1% to 20%.

8. The system of claim 1, wherein the duty cycle chosen can range from 80% to 100%.

9. The system of claim 2, wherein the one or more static thermal properties of 5 the electrode include one or more of mass of the electrode, shape of the electrode, and thermal constant of the electrode.

10. The system of claim 1, wherein the electrode includes a tip electrode.

10 11. The system of claim 1, wherein the electrode includes a ring electrode.

12. The system of claim 1, wherein the electrode includes an approximately 5 mm tip with a diameter of approximately .094 inches.

15 13. The system of claim 1, wherein the electrode includes a ring electrode.

14. The system of claim 1, wherein the electrode includes an array of ring electrodes.

20 15. The system of claim 1, wherein the RF energy source delivers RF energy having a frequency of 500 - 750 kHz.

16. A system for delivering RF energy to an endocardial tissue, the system comprising:

25 a catheter having one or more electrodes proximate a distal end of the catheter, the catheter adapted for being positioned such that the one or more electrodes are adjacent the endocardial tissue; and

a power control system to provide power to the one or more electrodes, the power having a plurality of alternating on portions and off portions, one set of adjacent on and off portions defining a duty cycle;

5 wherein the on portions and off portions of the duty cycle are chosen as a function of thermal decay at the electrode and depending on one or more static thermal properties of the one or more electrodes.

17. The system of claim 16, wherein one or more static thermal properties of an electrode include a thermal constant of the electrode.

10

18. The system of claim 16, wherein one or more thermal properties includes a mass of the electrode.

15

19. The system of claim 16, wherein one or more thermal properties includes surface area of the electrode.

20. The system of claim 16, wherein the one or more static thermal properties of the electrode include one or more of mass of the electrode, shape of the electrode, and thermal constant of the electrode.

20

21. The system of claim 16, wherein one of the one or more electrode includes a tip electrode.

25

22. The system of claim 16, wherein one of the one or more electrodes includes a ring electrode.

23. A method of RF ablation comprising:
delivering RF energy to a tissue from an electrode;
determining a thermal decay over time proximate the electrode; and
changing a duty cycle of the RF energy in response to the thermal decay.

5

24. The method of claim 23, wherein determining a thermal decay includes measuring a temperature proximate the electrode at a first time and at a second later time.

10 25. The method of claim 23, wherein determining a thermal decay includes determining one or more thermal properties of the electrode.

26. A method of delivering RF energy to an endocardial tissue, the method comprising:

15 positioning a catheter having one or more electrodes such that at least one of the one or more electrodes is adjacent the endocardial tissue;
providing power to the one or more electrodes, the power having a duty cycle with an on portion and an off portion; and
measuring a temperature proximate the one or more electrodes at two

20 different times, and modifying the duty cycle as a function of a thermal decay as determined by the temperatures measured.

27. The method of claim 26, further including modifying the duty cycle depending on one or more static thermal properties of the one or more electrodes.

25

28. The method of claim 27, wherein modifying the duty cycle depending on one or more static thermal properties includes modifying the duty cycle depending on a thermal constant of the one or more electrodes.